

Environmental Monitoring and Assessment Program/ Biocriteria



The Usual Suspects:

Phil Kaufmann
Phil Larsen
Steve Paulsen
Dave Peck
Spence Peterson
Tony Olsen
Jim Omernik
Paul Ringold
Safa Shirazi
John Stoddard

The Newcomers:

Steve Cline
Mary Kentula
Dixon Landers
John Van Sickle

Impetus for EMAP



- **“What do you mean you don’t know how many acid lakes there are?”**

William Ruckelshaus - EPA Administrator - early 1980s

- **“Good News - Based on my years in the environmental movement, I think the Agency does an exemplary job of protecting the nation’s public health and quality of the environment.”**

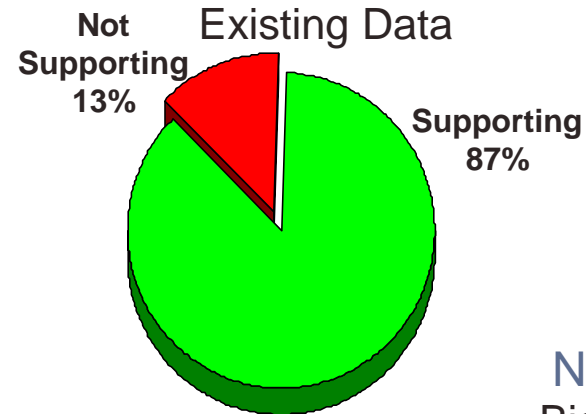
- **“Bad News - I can’t prove it.”**

William Reilly - EPA Administrator - 1989

Background – The State of Environmental Monitoring

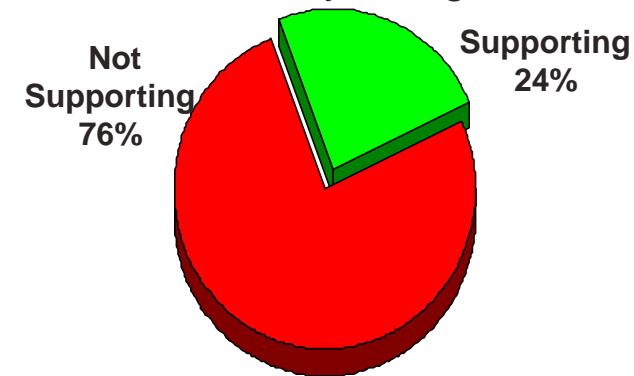


Delaware 305(b) Report
Chemical Evidence, Aggregation of
Existing Data



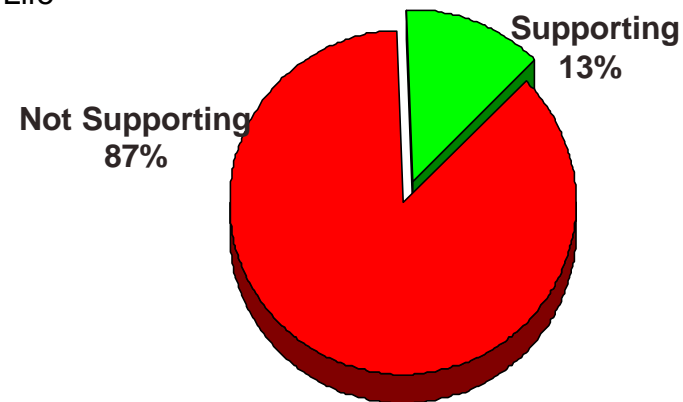
Percent of Stream Miles
Suitable for Aquatic Life

New Delaware Survey
Chemical Evidence,
Probability Design



Percent of Stream Miles
Suitable for Aquatic Life

New Delaware Survey
Biological/Habitat Evidence,
Probability Design



Percent of Stream Miles
Suitable for Aquatic Life



EMAP Tools

▲ Sample Survey Design

- ▲ Probability design – sites selected in proportion to their natural abundance
- ▲ Results extrapolated to target population with known confidence

▲ Biological Indicators

- ▲ Direct measures of ecological condition
- ▲ Societal value

▲ Stressor Indicators

- ▲ Associations with ecological condition
- ▲ Relative importance

▲ Regional demonstrations

Clients



- *Office of Water*
 - *Monitoring Branch*
 - *Biocriteria Branch*
- *EPA Regions*
- *States and Tribes*

Today's Specifics



▲ *Ecological Indicators:*

- ▲ *Mid-Atlantic Fish IBI (Larsen)*
- ▲ *Cold-Water Fish IBI (Hughes)*
- ▲ *Bird IBI (Bryce)*
- ▲ *Riparian condition (Ringold and Cline)*

▲ *Stressor Indicators:*

- ▲ *Physical Habitat (Kaufmann)*
- ▲ *Large river habitat (Landers)*
- ▲ *Soils (Shirazi/Burch-Johnson)*
- ▲ *Associations with ecological condition (Herlihy)*

Today's Specifics (cont.)



▲ *Survey Design:*

- ▲ *Site Selection/EMAP West (Olsen)*

▲ *Sampling Methods:*

- ▲ *EMAP-West Sampling (Peck)*
- ▲ *Wetlands Pilots (Kentula)*
- ▲ *Sampling Sufficiency (Cao)*

▲ *Ecological Classification:*

- ▲ *Ecoregions (Omernik)*

▲ *Assessment:*

- ▲ *Mid-Atlantic Highlands (MAHA) Streams (Paulsen)*
- ▲ *Northeast Lakes (Peterson)*
- ▲ *Acidification and Recovery (Stoddard)*